REMARKS

Initially, Applicants wish to express appreciation for the courteous personal interview afforded Applicants' attorney by the Examiner. The comments below are intended to provide a separate record of the substance of the interview held on September 3, 2003.

Claims 10-11, 13-16 and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al. in view of Engsbraten and Waldock. These references all disclose adding dry ingredients to an emulsion phase. In contrast, claim 10, as previously amended, requires the addition of an energy-reducing agent in the form of water or aqueous solutions. Step d) of claim 10 further requires that the liquid energy-reducing agent form a second discontinuous phase in the water-in-oil emulsion phase. The cited references are fatally deficient in that they do not disclose the addition of a liquid, water-based energy-reducing agent in the claimed amount to an emulsion blasting agent and that such energy-reducing agent be mixed uniformly and homogeneously into the emulsion blasting agent "to form a second discontinuous phase." These distinctions and order of addition of the energy-reducing agent are critical to the present invention.

As explained in the specification on page 5, lines 7 et seq.:

The present invention differs from this prior art in that the water or aqueous solution added to the emulsion blasting agent in the present invention is added to the emulsion blasting agent in an amount sufficient to reduce significantly its energy and is mixed uniformly and homogeneously throughout the emulsion phase. In fact, when mixed in this manner the water or aqueous solution forms a second discontinuous droplet phase to that formed by the initial oxidizer salt solution component. This second discontinuous phase renders the emulsion blasting agent more sensitive and stable than if the water or aqueous solution were combined initially with the inorganic oxidizer salt solution or if they were not mixed uniformly and homogeneously throughout the emulsion phase. (Emphasis supplied.)

Even though the final composition contains a considerable amount of water, it remains stable and detonable over time because the additional water is in the form of a second discontinuous phase. If that amount of water simply were added to the aqueous salt solution used to form the emulsion phase, the same detonability would not be achieved.

Applicants have found that by mixing this high amount of water or aqueous solution uniformly and homogeneously into the emulsion blasting agent to form a second discontinuous phase, the emulsion

remains reliably detonable. For example, mix 4, described on page 12 of the specification, and in Tables 1 and 2 on page 13, set for one hour before being detonated but remained reliably detonable even when its volume energy was reduced by about 55% and as much as 20% by weight water was added and mixed uniformly and homogeneously into the composition.

In the present invention, the order of addition of the water or aqueous solution energy-reducing agent is important. The energy-reducing agent must be added to an already formed emulsion blasting agent in order for the energy-reducing agent to form a second discontinuous phase within the emulsion phase of the emulsion blasting agent.

Another advantage of the present invention is that the energy-reducing agent reduces significantly the shock to bubble energy ratio of the emulsion blasting agent. As explained on page 12 of the specification:

> The shock to bubble energy ratio changed from about 56/44 with standard emulsion blasting agent (mix 1) to about 40/60 for gassed emulsion blasting agent with 20% energy-reducing agent (mix 4). This shift in energy from shock to bubble is highly desirable in blasting operations where wall and perimeter control is required.

The Lawrence et al., Engsbraten, and Waldock references, which all add solid ingredients, do not teach or disclose this beneficial effect of decreasing the shock to bubble energy ratio.

Claims 13 and 14 have been amended to depend on claim 10, thus obviating the rejection under 35 U.S.C. 112.

Accompanying this reply is an Information Disclosure Statement that cites Patterson et al. (U.S. patent no. 5,670,739). Although this patent discloses an emulsion having a second discontinuous phase, the second discontinuous phase is itself an emulsion and thus the resulting composition is a blend of two emulsions. Moreover, the second emulsion phase is not added as the emulsion blasting agent is being loaded into a borehole, as required in claim 10.

In view of the foregoing, Applicants respectfully request allowance of all claims.

Respectfully submitted,

Robert A. Bingham (Reg. No. 26,530)
Attorney for Applicants
DYNO NOBEL INC.
Eleventh Floor Crossroads Tower
Salt Lake City, Utah 84144
Telephone: (801) 364-4800

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Claims 1-9 (canceled)

Claim 10 (previously amended) A method of reducing the energy of an emulsion blasting agent as it is being loaded into a borehole comprising the steps of:

a) selecting an emulsion blasting agent comprising an aqueous inorganic oxidizer salt solution forming in droplet form a discontinuous phase and an organic liquid fuel forming a continuous phase;

b) conveying the emulsion blasting agent;

c) adding an energy-reducing agent to the emulsion blasting agent as it is being conveyed wherein the energy reducing agent is selected from the group consisting of water and aqueous solutions;

d) mixing the energy-reducing agent uniformly and homogeneously into the emulsion blasting agent to form a second discontinuous phase in an amount of from about 5% to about 22.5% by weight of the emulsion blasting agent;

e) adding gassing agents to the emulsion blasting agent to reduce its density and increase its sensitivity; and

f) loading the conveyed emulsion blasting agent into a borehole.

Claim 11 (original) A method according to claim 10 wherein the energy-reducing agent is added in an amount of from about 7.5% to about 17.5% by weight of the emulsion blasting agent.

Claim 12 (canceled)

Claim 13 (currently amended) A method according to claim 10 wherein the aqueous solutions contain solutes selected from the group consisting of inorganic oxidizer salts, urea, glycols and inorganic acids.

Claim 14 (currently amended) A method according to claim 10 wherein the gassing agents are added in amounts sufficient to reduce the density of the emulsion blasting agent to a range of from about 0.60 g/cc to about 1.30 g/cc.

Claim 15 (original) A method according to claim 10 wherein the borehole is a perimeter borehole.

Claim 16 (original) A method according to claim 10 wherein the energy reducing agent and gassing agents are added in varying amounts as the borehole is loaded to impart varying energies and densities to the emulsion blasting agent throughout the length of the borehole.

Claim 17 (canceled)

Claim 18 (original) A method according to claim 10 wherein the conveyed emulsion is pumped.